



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

Date: January 14, 2004

Subject: Results of Initial Hydrogeologic Assessment
Ellsworth Industrial Site
Downers Grove, IL

From: Bob Kay, Geologist
William J. Ryan, RPM
Remedial Response Section 4

Handwritten signatures of Bob Kay and William J. Ryan in black ink.

To: Mazin Enwiya
Remedial Project Manager, Section 2

EPA Region 5 Records Ctr.



265458

Mazin:

Per our discussions, this technical memorandum presents the results and interpretation of the data we have collected to date at the Ellsworth Industrial Site (hereafter referred to as the Site) in Downers Grove, Illinois. For the purposes of this Technical Memorandum, the Site refers to the area bounded by Burlington Avenue to the north, Belmont Avenue to the east, Elmore Avenue to the south, and Walnut Avenue to the west. For the purposes of this memorandum the study area refers to the Site and the area surrounding the Site where residential-supply wells are present.

There are essentially two geologic units of concern in the study area, the glacial deposits and the bedrock deposits. Lithologic and geophysical logs obtained from monitoring wells and geoprobe holes drilled during previous investigations at the Site and lithologic logs from residential-supply wells drilled in the surrounding study area indicate that the glacial deposits consist of intermingled sand-and-gravel and silt-and-clay, whereas the bedrock deposits consist of Silurian-aged carbonate. Lithologic data from the residential-supply wells is subject to uncertainty and is interpreted with some reservation.

The glacial deposits at the Site range in thickness from about 50 feet near Ames Supply to about 100 feet at the southeastern corner of the Site. In the remainder of the study area south of the Site the glacial deposits are typically about 100 to 130 feet thick. Lithologic logs indicate that the glacial deposits are composed of intermingled coarse-grained deposits (sand and sand-and-gravel) and fine-grained deposits (silt and clay). Fine-grained deposits are present near the land surface beneath most of the Site, except for a small area along Walnut street northwest of the Public Works office. Coarse grained deposits underlie fine-grained deposits beneath most of the Site and directly overlie the bedrock beneath much of the Site.

In the study area as a whole, lithologic logs from the residential-supply wells also indicate that fine-grained materials are present near the land surface, with coarse-grained materials typically interspersed. According to the lithologic logs from the residential-supply wells, coarse-grained deposits overlie the bedrock in essentially all of the study area surrounding the Site.

The bedrock deposits are composed of Silurian-aged dolomite. The altitude of the bedrock surface in the study area exceeds 640 feet above sea level (fasl) in much of the area southwest of the Site and northeast of the Site near well BD-10D (fig. 1). A north-south trending bedrock valley, defined by wells RW6, BD11D, MS1602D, BD8D, BD12D, and BD13D, appears to intersect the west-central part of the Site. Bedrock surface elevation in the valley is less than 630 fasl. The location of this valley shows fairly good correlation with the location of the center of the VOC plume, at least in the area north of College Road.

Water level measurements collected from several monitoring wells at the Site during mid- to late August 2003 and from 21 monitoring wells and 35 residential-supply wells in the surrounding area during September 23 and 24, 2003 indicate complex flow in both the glacial and bedrock deposits (tables 1, 2, 3)(figures 2 and 3). Well records obtained from the files at the Illinois State Water Survey indicate every residential-supply well in this area is open to the bedrock aquifer. It is assumed, therefore, that all of the residential-supply wells measured for this effort are open to the bedrock aquifer, even those for which we do not have well logs.

Water-level data from the wells in the glacial aquifer show variable water levels and show no consistent trends with location. Water-level data from well BD-13I may be anomalously high due to damage to the well and are not included in the discussion. All of the measured glacial wells are open at least partly to sand-and-gravel deposits. The variation in water levels in the glacial aquifer appears to be partly due to the elevation of the wells, with higher water levels typically being associated with wells screened at higher altitudes (BD-1I and presumably BD-9I) having higher water levels than the remaining wells. The altitude of the bottom of most of the wells open to the glacial aquifer is between 640 and 650 fasl. It is inappropriate to contour water levels from the glacial aquifer, so I have not attempted to do so. However, water levels in the wells whose bottom is between 640 and 650 fasl exceeded 656 fasl at wells BD-4I, BD-5I, BD-7I, and SB-17I and were less than 651 fasl in wells OV-6I, BD-6I, BD-8I, BD-14I, and BD-15I (figure 2). The high water levels are located in the eastern and western parts of the Site, whereas the lower water levels are located in the center of the Site, indicating the potential for flow in the glacial aquifer toward the center of the Site and generally toward the bedrock valley. This trend is generally consistent with that identified by Weston Solution, Inc. (Weston) during their prior water-level measurements.

Water-level data from wells in the bedrock aquifer can be broken down into two groups, data collected from the monitoring wells on Site (table 2) and data collected from residential-supply wells in the surrounding study area (table 3). Water levels in the monitoring wells open to the bedrock aquifer at the Site show an overall decrease from north to south, being greater than 751 fasl in wells BD-9D and 10D, being between 649 and 751 fasl in most of the center of the Site, and being less than 649 fasl in the southern part of the Site at wells BD-13D, -16D and perhaps well BD-18D (figure 3). Within these wells there are some anomalies, such as the somewhat elevated water level in well BD-14D and the low value for well BD-18D. The elevated water

level in well BD-14D is consistent with previous measurements collected by Weston. The low water level in well BD-18D does not agree with a measurement taken from this well during August 2003 (compare data for well BD-18D in tables 1 and 2), and the September 2003 value for this well may be erroneous.

Water levels in wells open to the residential-supply wells show a complex pattern in the study area, but show an overall decrease from northwest to southeast (figure 3). The complex pattern in the distribution of water levels in the residential-supply wells is due to the lack of a clear and consistent pattern in the water-level changes through space as well as the presence of large changes in water levels in wells located near each other. The complex distribution of water levels in the bedrock aquifer may be due to a number of potential influences, including the presence of pumping in nearby wells, variations in the degree of hydraulic communication between the bedrock aquifer and the overlying sand-and-gravel deposits, well construction (some wells may have a better surface seal than others), the altitude of the bedrock surface, and the complexity of the fracture network in the bedrock aquifer. Of these influences, pumping from residential-supply wells within the aquifer is likely to be the most substantial.

Water levels in the monitoring wells open to the bedrock aquifer measured in August 2003 (table 1), and September 2003 (table 3) are lower than water levels in the glacial deposits at the BD-11/D, BD-4I/D, BD-5I/D, BD-6I/D, BD-7I/D, BD-8I/D, and BD-13I/D well clusters. The absence of water in the well open to the glacial deposits at the BD-9I/D and BD-14-I/D clusters precludes determination of vertical directions of flow at these wells. However, the large difference in altitude between the bottom of well BD-9I and the water level in well BD-9D indicates downward flow is probable at this cluster, whereas the small difference between the altitude of the bottom of well BD-14I and the water level in well BD-14D indicates flow may be downward, horizontal, or upward. Water -level data indicate the potential for water to move down from the glacial deposits into the bedrock aquifer beneath most or all of the Site. The fairly small (less than 1.0 feet) difference in water levels between the glacial and bedrock wells at the BD-6I/D, BD-8I/D, and BD-14I/D well clusters indicates that the bedrock aquifer is in good hydraulic connection with that part of the glacial deposits monitored by the wells in these areas. The larger difference in water levels at the other well clusters indicates that the intervals of the drift and bedrock aquifers monitored by these wells may not be as hydraulically interconnected.

Analysis of specific-capacity data obtained from the logs of 28 residential-supply wells indicates that the transmissivity of the bedrock aquifer ranges from 53 to 101 feet squared per day (ft^2/d), with a geometric mean value of 61 ft^2/d . Dividing the transmissivity by the open interval of the wells the horizontal hydraulic conductivity of the bedrock aquifer ranged from 0.43 to 3.0 feet per day (ft/d), with a geometric mean value of 0.86 ft/d . There are no apparent spatial trends to the distribution of transmissivity based on the specific-capacity data.

Slug tests were performed in six monitoring wells open to the glacial drift aquifer and nine monitoring wells open to the bedrock aquifer. Slug-test data from drift well OV-6I were erratic and could not be analyzed. Horizontal hydraulic conductivity values calculated from the slug test data from the five wells open to the glacial drift that provided analyzable data ranged from 0.0716 ft/d at well BD-15I to 79.6 ft/d at well SB-17I and had a geometric mean value of 4.96 ft/d . All of these wells are open to a combination of sand and gravel and silt and clay deposits

and it is assumed that these values represent primarily the hydraulic properties of the sand-and-gravel part of the deposit. The low horizontal hydraulic conductivity value for well BD-15I indicates this well may have a clogged well screen or gravel pack and this value may not be representative of the hydraulic properties of the aquifer. Horizontal hydraulic conductivity values calculated from the slug test data from the nine wells open to the bedrock aquifer ranged from 0.328 ft/d at well BD-7D to 65.2 ft/d at well BD-10D and had a geometric mean value of 13.3 ft/d. The data indicate that the entire aquifer (where tested) is permeable, but the aquifer beneath the eastern part of the Site may be more permeable than beneath the western part of the Site.

If you have any questions or comments feel free to call me at 6-7938 or Bill Ryan at 3-4374.

cc. S. Padavoni

Bedrock Surface Elevations



Water level elevations in drift wells recorded 9/23/03

△ BD 9I / <673

△ BD-1I / 671.44

△ BD 6I / 649.90

△ BD 4I / 658.76

△ BD 8I / 651.16

△ BD 7I / 657.06

△ OV6I / 650.12

△ BD 5I / 656.53

△ BD-15I / 649.27

△ BD 14I / <651

△ BD 13I / 703.02

△ SB 17I / 657.11



0.1 0 0.1 Miles

Bedrock Water Levels

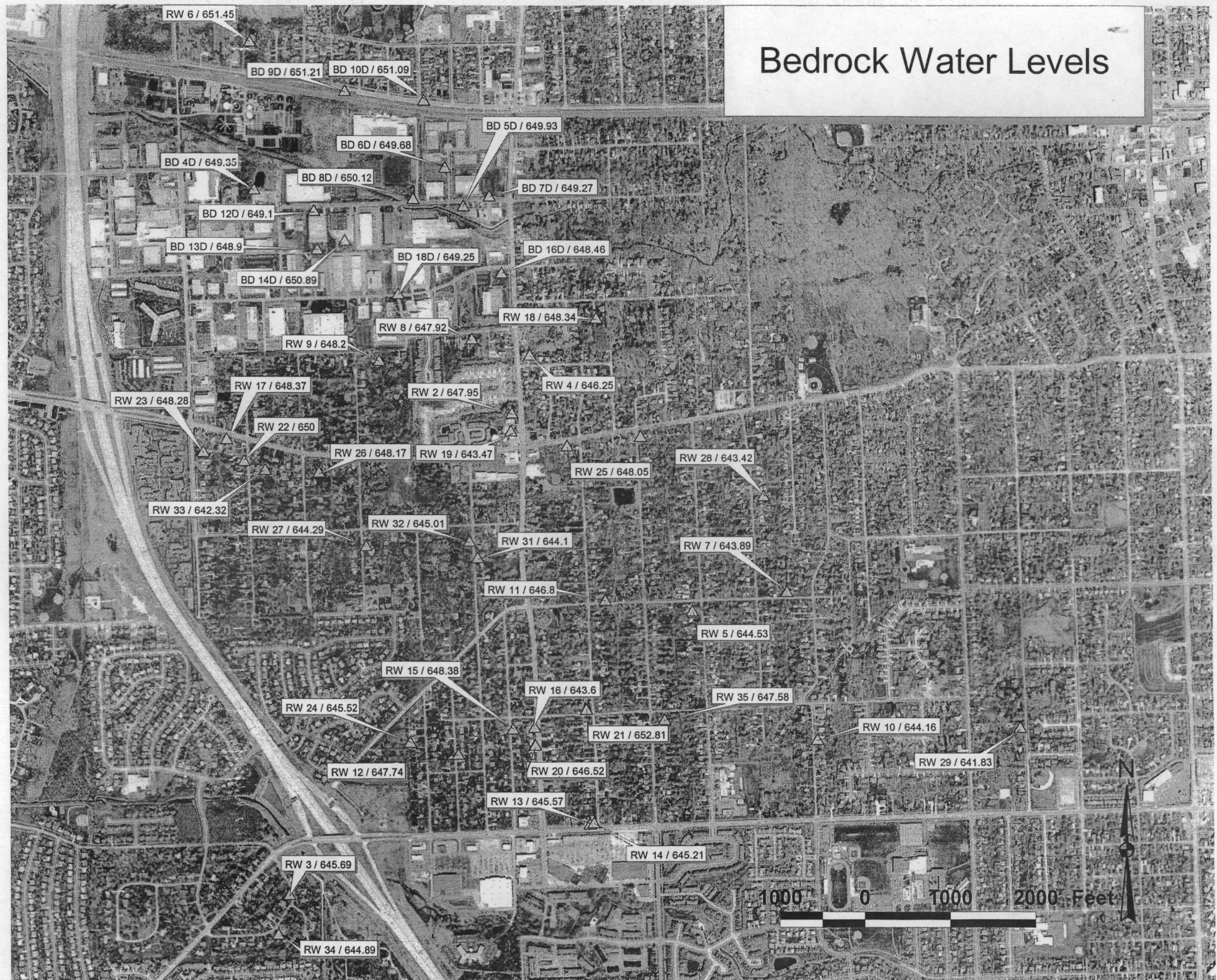


Table 1. Well information and water-level data from select monitoring wells, Ellsworth Industrial site, Downers Grove, Illinois. [NT, not taken; -, unavailable; Bold denotes uncertain value]

Well	Measuring Point Altitude (feet above sea level)	Depth to Water (feet)	Water-Level Altitude (feet above sea level)	Depth of Screen Interval (feet)	Depth of Open Interval (feet)	Altitude of Bottom of Open Interval (feet above sea level)	Date of Water-Level Measurement	Geophysical Logs?
BD-1I	696.56	25.12	671.44	27-37	23-35	662	8/26/03	no
BD-1D	696.25	46.62	649.63	60-70	57-70	626	8/26/03	no
BD 4I	701.65	42.89	658.76	47-57	45-57	645	8/14/03	no
BD 4D	701.83	52.08	649.75	71-81	69-81	620	8/14/03	no
BD 5I	689.05	NT	-	37-47	34-47	642	-	no
BD 5D	689.31	NT	-	54-64	51-67	622	-	no
BD 6I	692.91	NT	-	45-50	43-50	643	-	no
BD 6D	692.97	NT	-	64-74	62-74	619	-	no
BD 7I	690.02	32.35	657.67	36-46	34-46	644	8/14/03	no
BD 7D	689.64	39.70	649.94	60-70	57-70	620	8/14/03	no
BD 8I	689.86	38.70	651.16	35-45	33-45	645	8/20/03	no
BD 8D	690.00	39.88	650.12	68-78	68-80	610	8/20/03	no
BD 9I	715.19	dry	<673	37-42	31-42	673	8/13/03	no
BD 9D	715.12	63.55	651.57	79-89	77-92	623	8/13/03	yes
BD 10D	717.35	66.26	651.09	79-89	77-89	628	-	no
BD-11D	-	Could not find this well	704.09	94-104	90-104	-	-	no
BD 12D	700.30	50.81	649.49	78-88	75-88	612	8/20/03	yes
BD 13I	701.46	NT	-	41-46*	39-46*	634	-	no
BD 13D	701.46	52.10	649.36	79-89	76-89	612	8/20/03	yes
BD 14I	698.73	dry	<651	42-47	41-47	651	8/20/03	no
BD 14D	699.28	47.95	651.33	73-83	71-83	616	8/20/03	yes
BD 16D	705.36	56.58	648.78	74-84	72-84	621	8/20/03	yes
SB 17I	694.96	37.35	657.61	35-45	30-45	650	8/26/03	no
BD 18D	706.85	57.60	649.25	81-91	79-91	616	8/14/03	no
OV6I	693.60	43.48	650.12	40-50	38-50	644	8/26/03	no
BD-15I	690.22	40.95	649.27	35-45	32-45	645	8/26/03	no

Table 2. Well information and water levels in select residential-supply wells in the vicinity of the Ellsworth Industrial Site, Downer's Grove, Illinois, September 23-24, 2003. [?-unknown; Bold denotes uncertain of accuracy; BR, bedrock aquifer; >, greater than; <, less than]

Well name	Measuring-Point	Depth to Water	Water-Level	Depth of Open	Aquifer
	Altitude (feet above sea level)		Altitude (feet above sea level)		
RW1	744.61	98.10	646.51	115-140	BR
RW2	760.20	112.25	647.95	128-180	BR
RW3	711.79	66.10	645.69	?	BR
RW4	747.44	101.19	646.25	?-240	BR
RW5	770.80	126.27	644.53	?	BR
RW6	717.35	65.90	651.45	106-185	BR
RW7	773.09	129.20	643.89	?	BR
RW8	739.92	92.00	647.92	?	BR
RW9	730.39	82.19	648.20	?	BR
RW10	745.55	101.39	644.16	?	BR
RW11	747.55	100.75	646.80	?	BR
RW12	738.36	90.62	647.74	?	BR
RW13	745.57	>101	<645.57	?	BR
RW14	744.91	99.70	645.21	?	BR
RW15	743.58	95.20	648.38	?	BR
RW16	745.20	101.60	643.60	110-160	BR
RW17	767.77	119.40	648.37	120-205	BR
RW18	738.00	89.66	648.34	102-185	BR
RW19	760.09	116.62	643.47	100-?	BR
RW20	744.19	97.67	646.52	115-140	BR
RW21	752.61	99.80	652.81	111-175	BR
RW22	765.09	115.09	650.00	110-190	BR
RW23	765.61	117.33	648.28	120-205	BR
RW24	738.57	93.05	645.52	120-140	BR
RW25	759.55	111.50	648.05	130-175	BR
RW26	757.15	108.98	648.17	120-170	BR
RW27	748.39	104.10	644.29	126-185	BR
RW28	763.47	120.05	643.42	126-205	BR
RW29	754.57	112.74	641.83	144-185	BR
RW30	742.81	94.50	648.31	116-175	BR
RW31	749.00	104.90	644.10	128-171	BR
RW32	757.86	112.85	645.01	105-150	BR
RW33	763.32	121	642.32	120-205	BR
RW34	731.09	86.20	644.89	?	BR
RW35	755.89	108.31	647.58	125-163	BR

Table 3. Water-level elevation in select monitoring wells at the Ellsworth Industrial Site, Downers Grove, Illinois September 23,2003. (Bold denotes uncertain measurement; <, less than)

Well	Measuring Point Altitude (feet above sea level)	Depth to Water (feet)	Water-Level Altitude (feet above sea level)	Vertical Hydraulic Gradient (foot per foot)
BD 4I	701.65	43.01	658.64	0.387
BD 4D	701.83	52.48	649.35	
BD 5I	689.05	32.52	656.53	0.388
BD 5D	689.31	39.38	649.93	
BD 6I	692.91	43.01	649.90	0.00917
BD 6D	692.97	43.29	649.68	
BD 7I	690.02	32.96	657.06	0.325
BD 7D	689.64	40.37	649.27	
BD 8I	689.86	39.19	650.67	0.0270
BD 8D	690.00	40.22	649.78	
BD 9I	715.19	dry	<673	
BD 9D	715.12	63.91	651.21	
BD 10D	717.35	66.26	651.09	
BD 12D	700.3	51.20	649.10	
BD 13I	701.46	7.44	694.02	
BD 13D	701.46	52.56	648.90	
BD 14I	698.73	dry	<651	
BD 14D	699.28	48.39	650.89	
BD 16D	705.36	56.90	648.46	
SB 17I	694.96	37.85	657.11	
BD 18D	706.85	63.80	643.05	

Table 4. Horizontal hydraulic conductivity values from slug testing, Ellsworth Industrial Site, Downers Grove, Illinois (Kh, horizontal hydraulic conductivity; ft/d, feet per day; -, no test performed; na, test data did not give a good line and could not be analyzed)

Well	Kh (ft/d)	Kh (ft/d)	Kh (ft/d)	Kh (ft/d)	Geometric Mean Value (ft/d)	Hydraulic Unit
BD-1I	3.36	7.08	6.22	-	5.29	Glacial aquifer, sand and gravel
BD-1D	42.2	32.5	-	-	37.1	Bedrock aquifer
BD 4I	3.72	4.72	-	-	4.19	Glacial aquifer, sand and gravel
BD 4D	4.03	2.16	2.22	-	2.68	Bedrock aquifer
BD 7I	3.38	43.5	45.6	47.7	23.8	Glacial aquifer, sand and gravel
BD 7D	0.325	0.330	-	-	0.328	Bedrock aquifer
BD 8D	46.5	34.4	28.8	34.3	35.5	Bedrock aquifer
BD 9D	5.63	4.84	6.91	5.26	5.61	Bedrock aquifer
BD 10D	57.9	79.6	61.6	63.8	65.2	Bedrock aquifer
BD 12D	10.6	10.1	9.5	12.5	10.6	Bedrock aquifer
BD 13D	14.3	15.0	13.6	14.4	14.3	Bedrock aquifer
BD 14D	32.8	32.8	30.2	-	31.9	Bedrock aquifer
BD 16D	34.4	39.7	32.7	36.1	35.7	Bedrock aquifer
SB 17I	92.2	68.7	na	na	79.6	Glacial aquifer, sand and gravel
BD 18D	25.8	27.1	39.3	na	30.2	Bedrock aquifer
OV6I	na	na	na	na	na	Glacial aquifer, sand and gravel
BD-15I	0.0716	-	-	-	na	Glacial aquifer, sand and gravel
Geometric mean Kh of glacial aquifer (ft/d)	4.96					
Geometric mean of bedrock aquifer (ft/d)	13.3					

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EIP-GPW137-01 (10-20 FT)	
1,1,1-TRICHLOROETHANE	230
1,1,2-TRICHLOROETHANE	9.9
1,1-DICHLOROETHANE	32
1,1-DICHLOROETHYLENE	8.9
CARBONTETRACHLORIDE	18
CIS-1,2-DICHLOROETHANE	200
CHLOROFORM	0.28J
1,1,2-DICHLOROETHANE	2.9
TRICHLOROETHYLENE	210

EIP-GPW139-01 (20-30 FT)	
CHLOROMETHANE	0.45J

EIP-GPW153-01 (20-30 FT)	
1,1,1-TRICHLOROETHANE	0.22J

EIP-GPW156-01 (26-30 FT)	
1,1,1-TRICHLOROETHANE	0.39J

EIP-GPW105-01 (20-30 FT)	
1,1,1-TRICHLOROETHANE	2.2
CARBON TETRACHLORIDE	0.23J
TETRACHOROETHENE	0.41J

EIP-GPW125-01 (10-20 FT)	
1,1,1-TRICHLOROETHANE	30
1,1-DICHLOROETHANE	2
CARBONTETRACHLORIDE	2.8
TRICHLOROETHYLENE	0.29J

EIP-GPW160-01 (20-30 FT)	
1,1,1 TRICHLOROETHANE	5.1
CARBONTETRACHLORIDE	0.47J

EIP-GPW188-01 (15-25 FT)	
1,1,1-TRICHLOROETHANE	0.73J

EIP-GPW199-01 (10 FT)	
CHLOROFORM	0.2

EIP-GPW206-01 (10-20 FT)	
1,1,1-TRICHLOROETHANE	1.5
1,1-DICHLOROETHANE	0.62
CIS-1,2-DICHLOROETHANE	1.1
TETRACHOROETHENE	0.92
TRICHLOROETHYLENE	0.33J

EIP-GPW191-01 (10-20 FT)	
1,1,1-TRICHLOROETHANE	0.92J
1,1-DICHLOROETHANE	0.87
CIS-1,2-DICHLOROETHANE	0.043J
TRICHLOROETHYLENE	0.32J

EIP-GPW191-01 DUP (10-20 FT)	
1,1,1-TRICHLOROETHANE	0.98J
1,1-DICHLOROETHANE	0.95
TRICHLOROETHYLENE	0.29J

EIP-GPW145-01 (11-21 FT)	
CIS-1,2-DICHLOROETHENE	0.079J

EIP-GPW187-01 (10-20 FT)	
1,1,1-TRICHLOROETHANE	18J
1,1-DICHLOROETHANE	2
CIS-1,2-DICHLOROETHENE	0.21J
TRICHLOROETHYLENE	1.4

EIP-GPW190-01 (10-20 FT)	
1,1,1-TRICHLOROETHANE	0.16J
1,1-DICHLOROETHANE	2.0

EIP-GPW61-01 (20-30 FT)	
CHLOROMETHANE	0.43J

EIP-GPW64-01 (15-25 FT)	
CHLOROMETHANE	0.56

EIP-GPW99-01	
CHLOROMETHANE	2

EIP-GPW129-01 (10-20 FT)	
1,1,1-TRICHLOROETHANE	620J
1,1,2-TRICHLOROETHANE	0.38J
1,1-DICHLOROETHANE	64J
CHLOROETHANE	5.4J
CHLOROFORM	0.32J
CIS-1,2-DICHLOROETHANE	0.28J
TRICHLOROETHYLENE	0.26J

EIP-GPW185-01 DUP (19-29 FT)	
CHLOROETHANE	0.046J

EIP-GPW130-01 (10-20 FT)	
1,1,1-TRICHLOROETHANE	360
1,1-DICHLOROETHANE	180
1,1-DICHLOROETHYLENE	19
CHLOROETHANE	52
CIS-1,2-DICHLOROETHANE	0.93J
TRICHLOROETHYLENE	0.22J

EIP-GPW128-01 (7-17 FT)	
1,1,1-TRICHLOROETHANE	1200
1,1,2-TRICHLOROETHANE	0.48J
1,1-DICHLOROETHANE	370
1,1-DICHLOROETHYLENE	42J
1,2-DICHLOROETHANE	0.88
CHLOROETHANE	5.6
CHLOROFORM	0.33J
CIS-1,2-DICHLOROETHENE	4.1
TRICHLOROETHYLENE	19

PW127-01 (7-17 FT)	
DICHLOROETHANE	100J
ILOROETHANE	18J
ILOROETHYLENE	3.6J
ETRACHLORIDE	8.5J
THANE	1.1J

EIP-GPW150-01 (9 FT)	
TETRACHOROETHENE	0.19J

EIP-GPW152-01 (9.5 FT)	
TETRACHOROETHENE	0.21J

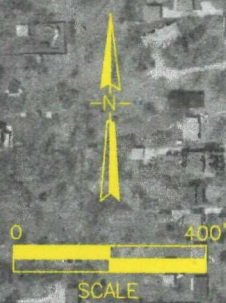


FIGURE 1-2

DRAFT

RESPONSE ACTION CONTRACT
U.S. EPA CONTRACT No. 68-W7-0026
WORK ASSIGNMENT No. 233-RICO-B51W
DOCUMENT CONTROL No. RFW233-XX-XXXX

GROUNDWATER ANALYTICAL RESULTS
(SELECTED CHLORINATED SOLVENT COMPOUNDS ONLY)
ELLSWORTH INDUSTRIAL PARK
Downers Grove, Illinois

